



MSFC PROPULSION SYSTEMS DEPARTMENT

Knowledge Management Project

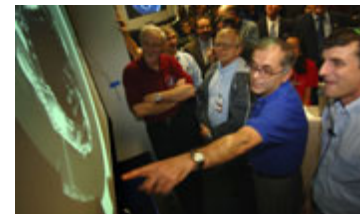
NASA KM International Conference

17 - 19 July 2007



Collaborate. . .

Communicate. . .



Innovate. . .



Motivate



Agenda

MSFC PROPULSION SYSTEMS DEPARTMENT **Knowledge Management Pilot Project**

- **PSD KM Project Overview / Approach / Purpose**
- **Strategic Planning of PSD KM Initiative**
- **Systems Requirements / Design Definition**
- **KM Technology Architecture Description**
- **PSD KM System UI / Custom Features**
- **Future Planning**
- **PSD KM Search Functionality Demo**



MSFC PSD KM STRATEGIC PLAN

Overview/Approach

- **KM Needed to Support Knowledge Capture/Preservation and an Information Sharing Culture**
 - “If MSFC is to remain world-class in rocket propulsion systems design and development, substantial improvement in access to current and historical design, development and operational information must be made.” *
 - “NASA has not demonstrated the characteristics of a learning organization after investigators observed mistakes being repeated...” **
- **MSFC PSD KM initiative approach**
 - Develop a KM Pilot project, within the context of a 3-5 year KM strategy
 - Introduce and evaluate the use of KM within PSD
 - IT Infrastructure, Turbomachinery Community of Practice (CoP)
 - Extend KM system functionality based on results and user feedback



MSFC PSD KM Initiative

Project Purpose

- **Develop a Knowledge Management Strategic Plan for MSFC PSD**
- **Define and prioritize KM requirements, tailored to PSD's goals and objectives**
- **Provide KM IT infrastructure, processes and tools to enable and promote a learning / sharing culture**
- **Assure enterprise alignment and extensibility of PSD KM solution**
- **Apply leading edge Knowledge Management technologies and organizational practices to institutionalize NASA's experiences—promoting NASA engineer's competencies and growth.**



MSFC PSD KM Initiative

KM Project Key Priorities

- **Improve Safety, Reliability and Quality**
- **Reduce risk and impact of knowledge attrition associated with an aging workforce.**
- **Enable Learning Sharing Culture**
 - Communities of Practice, collaboration, knowledge sharing/capture
 - Training
- **Provide Efficient, Effective Access To Propulsion Systems And Component Knowledge Data**
 - Apply cutting edge technologies and innovation to PSD knowledge assets
 - Infuse experiential knowledge, lessons learned, best practices into decision process
 - Reduce Test/Fail/Fix cycle resulting from failures and anomalies
- **Demonstrate KM utility and functionality**
- **Increase stakeholders' awareness of KM technical innovations and benefits**
- **Extend PSD KM system functionality**
 - ARES propulsion systems and component designs
 - Engineering Directorate
 - MSFC...



MSFC PSD KM STRATEGIC PLANNING

Data Gathering

- **Formed PSD KM Team**
- **Conducted Two Day Group Work-Session for PSD KM Strategy Formulation**
 - **Developed PSD KM Purpose, Objectives, Priorities**
- **Conducted Structured Interviews**
 - **Examined Engineering Process Workflows**
 - **Collaborative, Resource and Analytical Tool Interfaces**
- **Surveyed Personnel**
- **Performed Independent Research**



MSFC PSD KM STRATEGIC PLANNING

Cultural Change

Cultural Change Survey

➤ PSD Benchmarking

Working Together
Knowledge Sharing Incentives
Enterprise KM Strategy
Existing KM Infrastructure, capabilities
Senior Management Advocacy
Skills & Competencies
Change Management
Workforce Development
Organizational Alignment
Operational Processes
Performance Measurement
Evaluation & Feedback
Accountability & Empowerment

The image shows a stack of survey forms. The top form is titled 'Cultural Change Survey' and includes a 'Number' and 'Date' field. It has a rating scale from 1 (Poor, or 'Strongly Disagree') to 5 (Excellent, or 'Strongly Agree'). The survey is divided into several sections: Information, Organizational Alignment, Operational Processes, and Performance Measurement. Each section contains a list of statements to be rated. For example, under 'Information', there are statements like 'I can explain the organization's business goals, objectives, and strategies' and 'I understand the organization's general financial picture'. Under 'Organizational Alignment', there are statements like 'Everyone (individuals, teams, departments/units) is working toward the same organizational goals and objectives' and 'I understand how my job contributes to the organization's objectives, goals, and strategies'. Under 'Operational Processes', there are statements like 'I understand the organization's operational processes and how they support the organization's objectives, goals, and strategies' and 'I understand how my tasks add value to the organization's objectives, goals, and strategies'. Under 'Performance Measurement', there are statements like 'I understand how my tasks add value to the organization's objectives, goals, and strategies' and 'I understand how my tasks add value to the organization's objectives, goals, and strategies'. The forms also include a color-coded grid for data entry, with colors ranging from red (Poor) to green (Excellent).

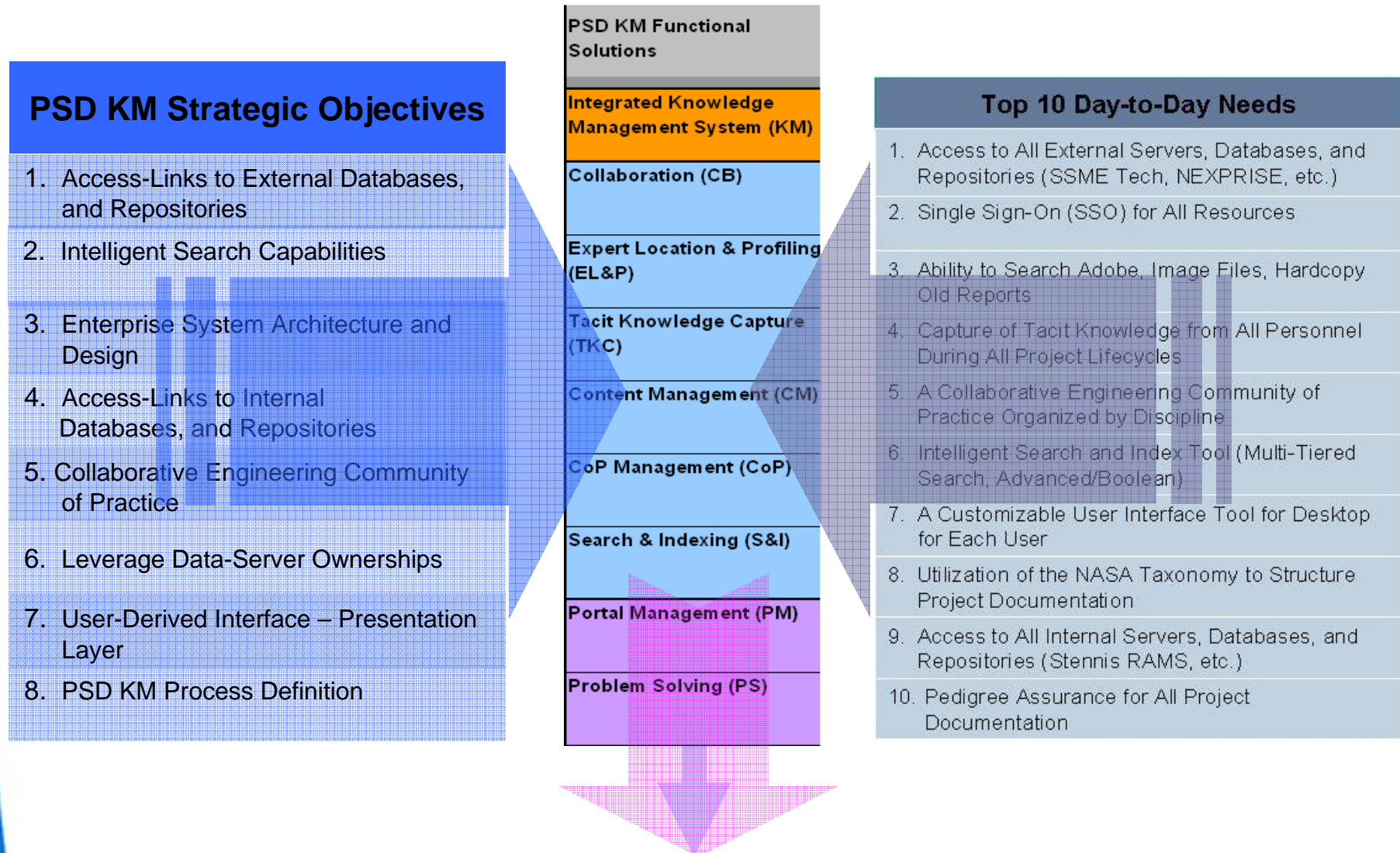
PSD is perceived by survey respondents as being ready to accept cultural change.

**Challenges identified:
KM Infrastructure/Tools,
Knowledge Sharing Motivation & Incentives,
Leadership Advocacy**



MSFC PSD KM STRATEGIC PLANNING

Solutions Map





Functional Rating

Programmatic Rating

10



Lessons Learned

Vendor Evaluations

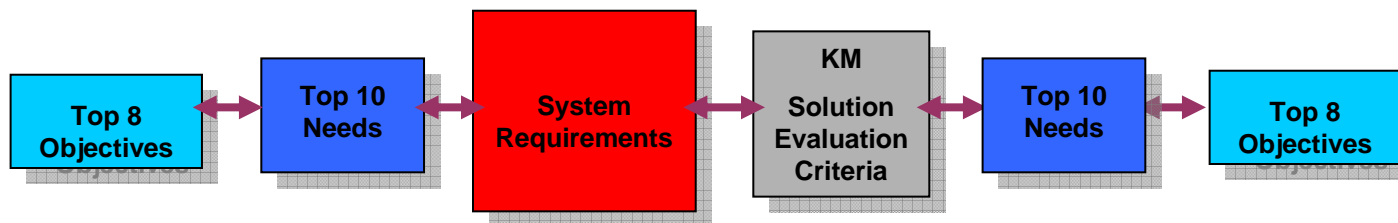
- **Obtain available industry trade studies on alternative portal technologies to understand key issues and potential solutions. (CMS Watch, Gartner, Forrester)**
- **Focus analysis upon any integration requirements between software applications that must work as a system**
- **Obtain appropriate training on the short list of candidate applications**
- PLUS -
- **Conduct rigorous, real-world evaluation of candidate software applications** unless the risk is well defined and is low.
 - **Whenever possible, use a hands-on evaluation of the actual product** in the actual or similar environment
 - OR if not practical -
- **Conduct Power User interviews** of candidate products to define practical strengths and weaknesses. Interview from a carefully developed list of questions that reflect the precise requirements / use case to be implemented.

Rigorously Evaluate Integration Aspects of the Solution in Addition to Component Functionality



System Requirements and Design Summary

- **Structured systems engineering approach employed at project outset; User defined, user centric, concept to solution**
 - Formed initial MSFC team using Integrated Product Team constituency
 - Included Shuttle Project & Engineering, ER Component Design, ED Disciplines, S&MA participants
 - CIO, Enterprise Architect, CLV Projects, CLV KM, NASA Engineering Network (NEN) represented in requirements / design reviews
- **PSD KM Project Milestones Achieved**
 - Strategy developed, Strategic Plan delivered February 2006
 - System Requirements defined, System Requirements Specification delivered May 2006
 - Conceptual Design Review conducted June 2006
 - Critical Design Review conducted October 2006
 - Trade Study / IT solution re-evaluation July 2007
- System designed to align with ARES, Constellation and Enterprise Architecture
- Compliant with NIST / FIPS standards, application security plan is approved
- Delta Design Review will address final system design specifications
 - Agency Deployed MOSS Portal Platform



Solution traceable to user defined objectives, user needs and system requirements

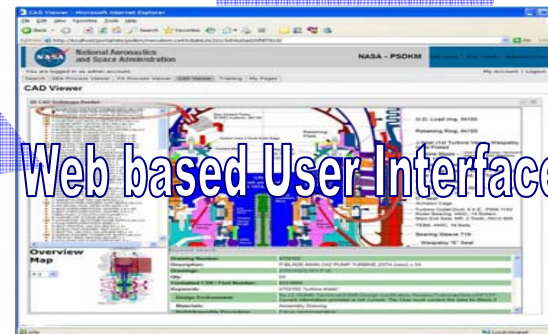
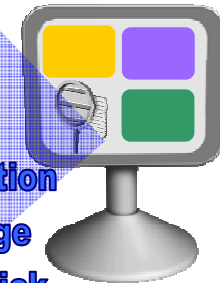


What is PSD KM?



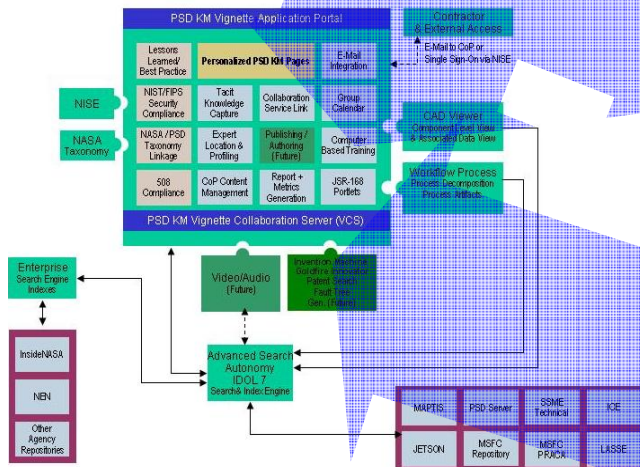
Engineering Communities (IPTs)

Engineering Data, Collaboration and Experiential Knowledge Available with a Point and Click



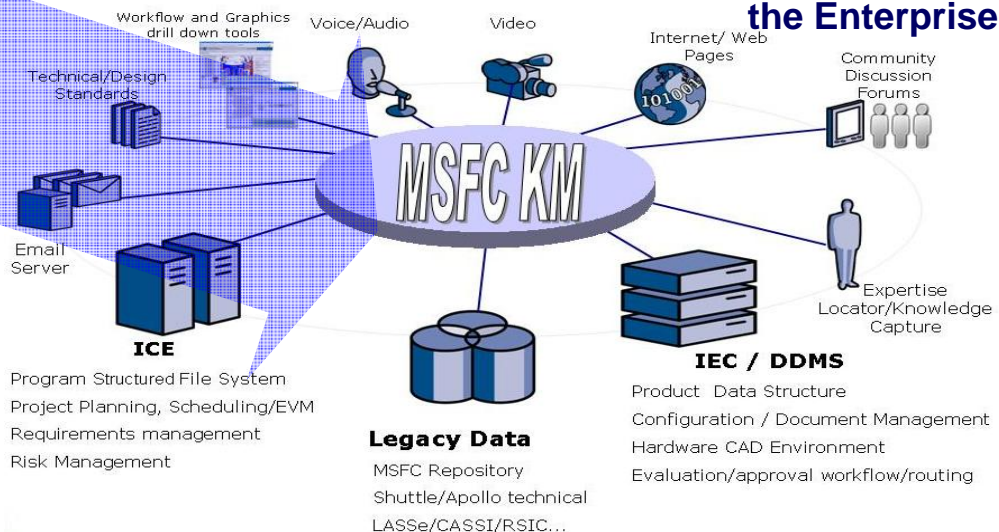
Web based User Interface

Broad Range of Data Resources/Types Across the Enterprise



Network Infrastructure and SOA IT Solution

- Agency MOSS Portal Platform
- Autonomy IDOL 7 Search Engine
- Custom Engineering Process and CAD Navigation Tools

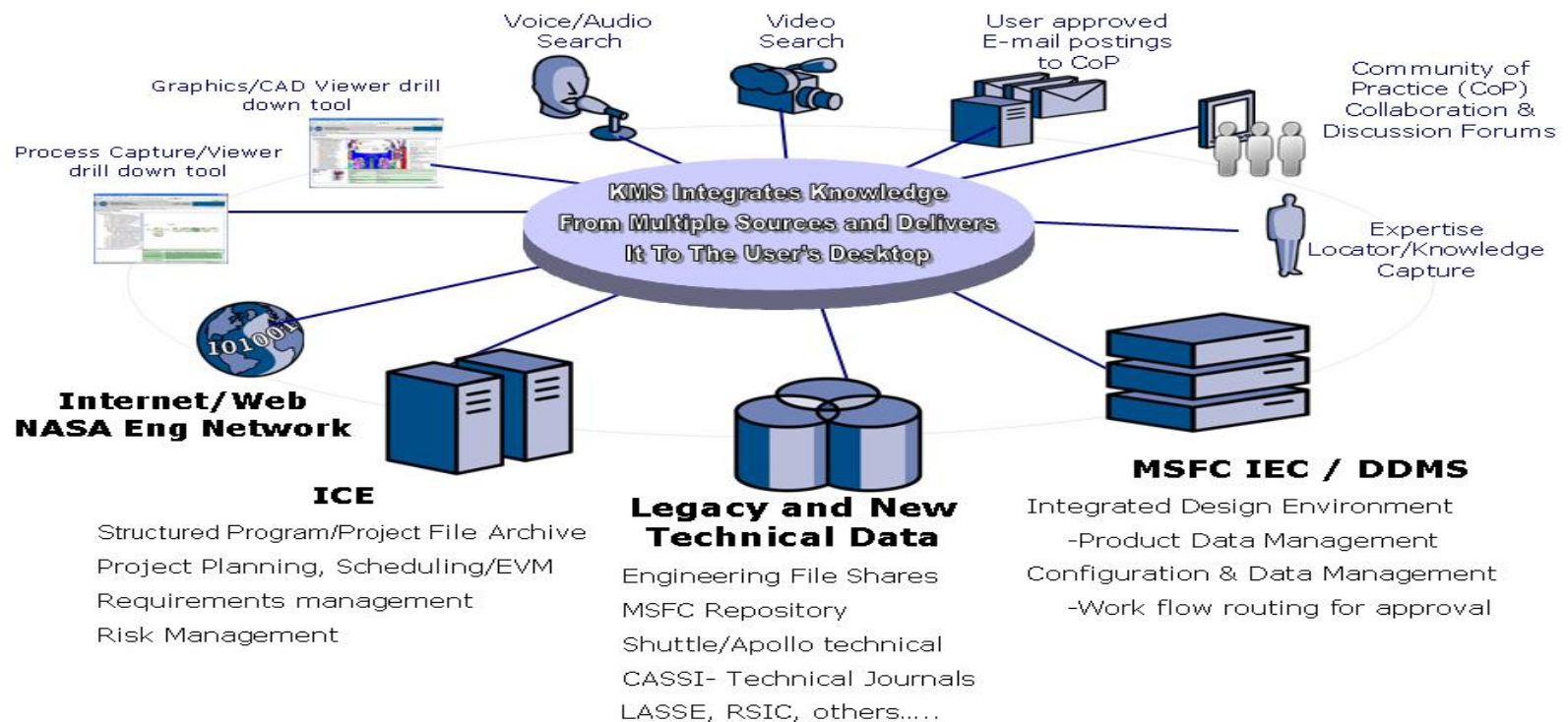




MSFC KM Key Functionality

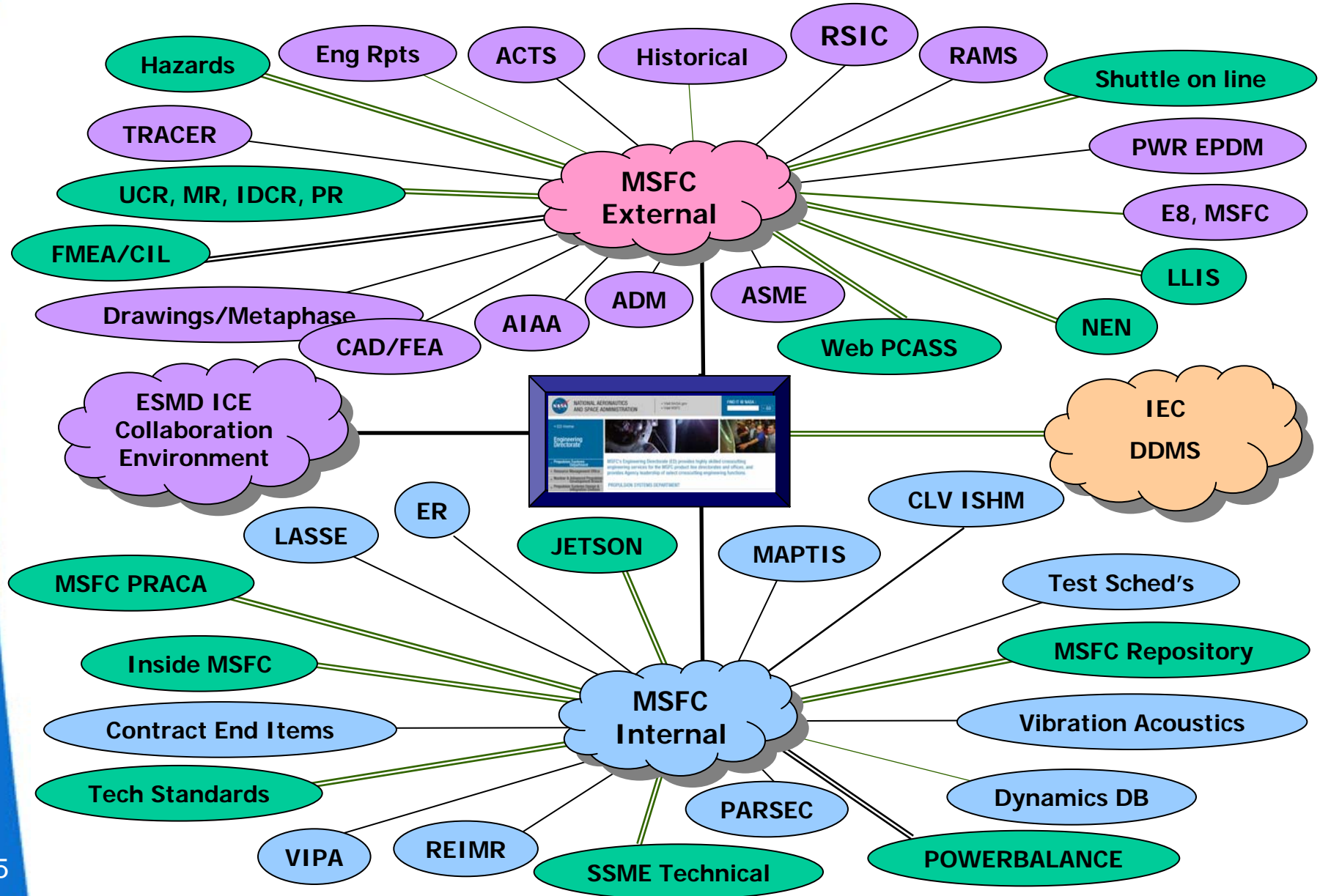
Key KMS Features:

- Single sign-on access and advanced data search of unstructured & structured technical data archives (Super “Google”)
 - Global Search Returns from all Knowledge Sources
- Human expertise locator (Ask The Expert?)
- IPT and/or discipline focused on-line “Community of Practice” Collaboration Environment
- Knowledge capture/retrieval of discussion board/e-mail threads via on-line “Community of Practice”
- Process capture/viewer with point and click navigation to each process step instructions and all relevant data
- 3D Graphics/CAD Viewer with point and click navigation to all relevant “piece-part” data





MSFC PSD KM DATA TYPES / RESOURCES





PSD KM DATA Interface

Memorandum Of Understanding

Memorandum of Understanding

MSFC PSD KM System



MEMORANDUM OF UNDERSTANDING (MOU)

BETWEEN
THE

MSFC PROPULSION SYSTEMS DEPARTMENT (PSD)
KNOWLEDGE MANAGEMENT (KM) SYSTEM

AND

TARGET SYSTEM

17 July 2007

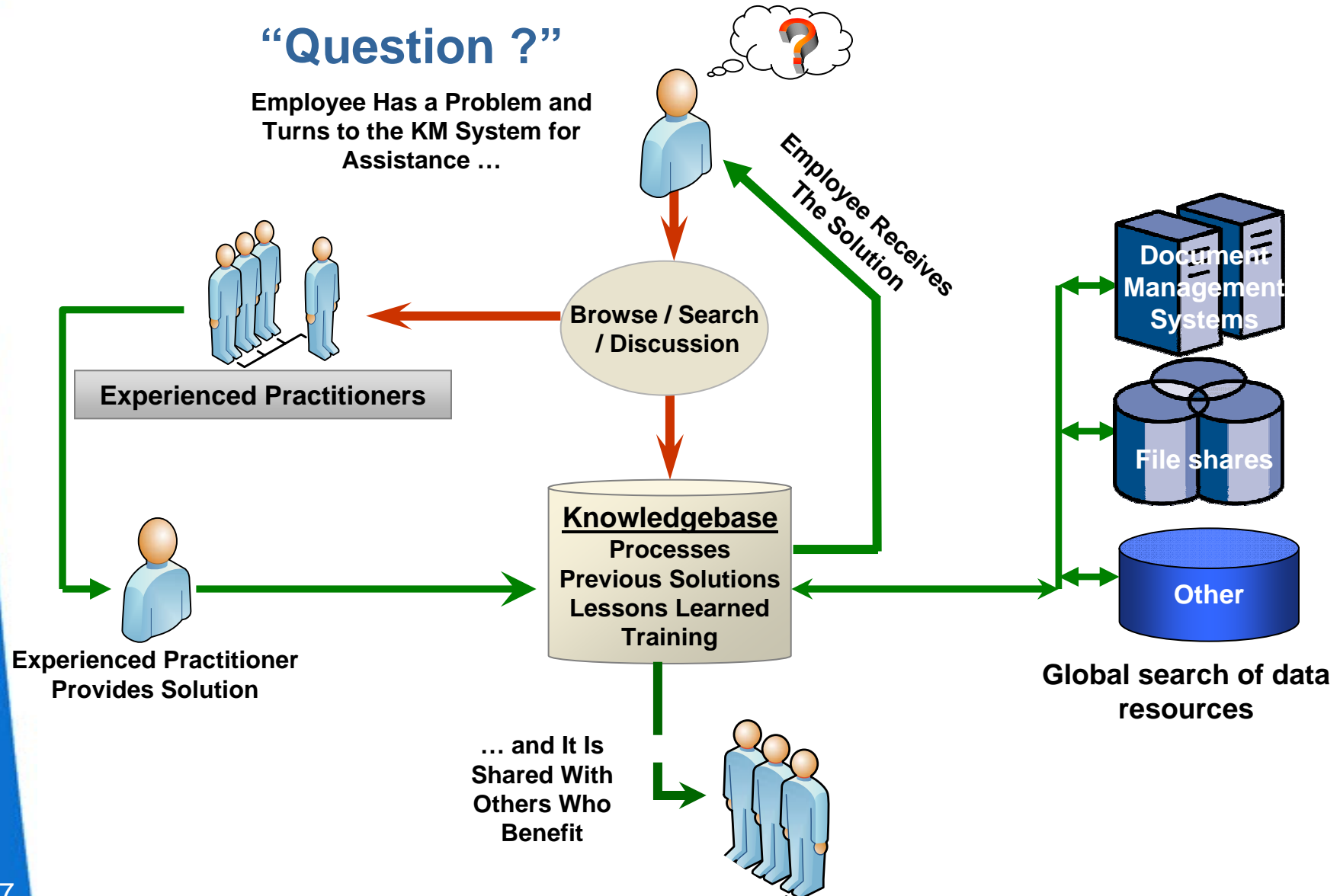


MSFC PSD KM PROJECT

Knowledge Capture

“Question ?”

Employee Has a Problem and
Turns to the KM System for
Assistance ...







PSD KM Data Architecture Solution

- PSD KM Aligns with key ARES, Constellation and Enterprise data architecture needs
 - **Data integration and user requirements definition**
 - Engineering Community (IPT) defined requirements
 - Engineering process models (value streams)
 - Enabling data architecture, tools, collaborative, training and knowledge resources identified, mapped, integrated
 - **IT Solution, User Interface Definition**
 - Develops / extends IT solution to establish a web based engineering community interface
 - Provides immediate access to mission enabling resources
 - **Leverages pilot system infrastructure and SOA KM technology investment to offer critical data architecture solutions**



User Interface





MSFC PSD KM PROJECT

User Interface Navigation Flow

Category Search - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address C:\PSD KM\Sample UI\Category Search.htm

Google nasa msfc

+ NASA Home
+ MSFC Home

Marshall Space Flight Center

+ Propulsion Systems Department Knowledge Management System

+ COMMUNITIES + PROCESS + CAD VIEWER + MY PAGE - SEARCH

- RETRIEVAL + COMMUNITY + CATEGORIES + CLUSTERING + SAVE

Basic Advanced Boolean Parametric + GO

Turbine blade ECP

Categories Data Sources Query Parameters

- Home
 - Lessons Learned
 - Best Practices
 - Configuration
 - Critical Design Review
 - Drawings
 - Engineering Change Proposals (ECP)
 - Field Engineering Change (FEC)
 - Hardware Readiness Review (HRR)
 - High Pressure Oxidizer Turbopump (HPOTP) Photographs
 - Material
 - Critical Items List (CIL) / Hazards
 - Failure Mode & Effects Analysis (FMEA)
 - Design Environment
 - History
 - Non-Conformance
 - Service Life
 - Verification & Validation

Retrieval Results

1 - 6 of 591 results

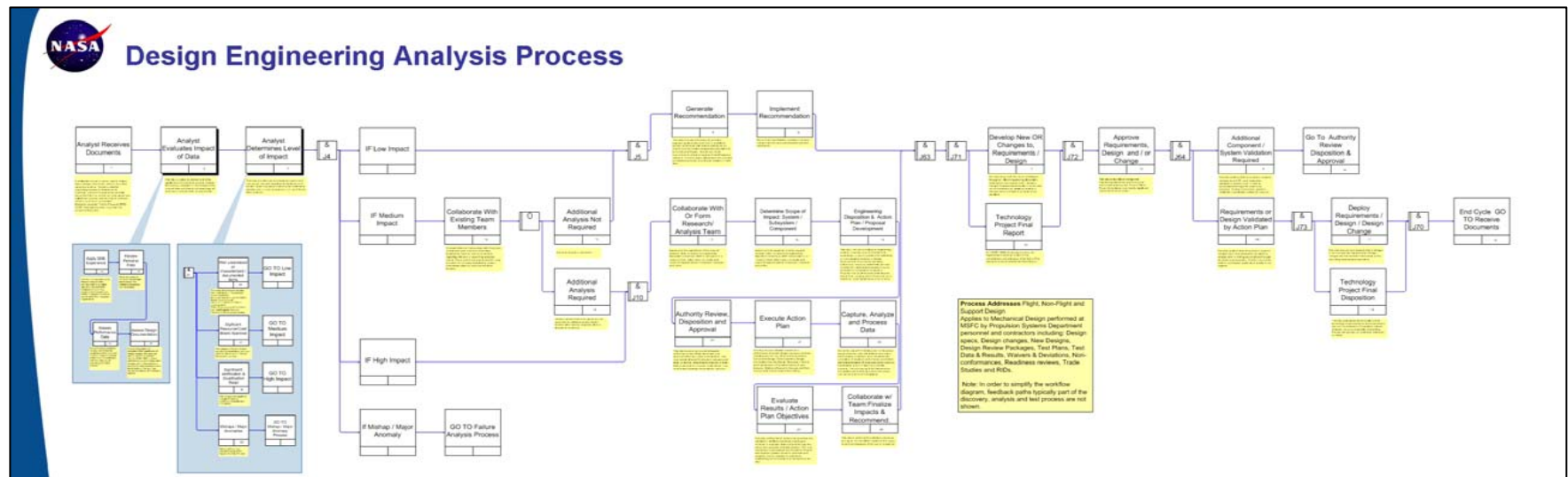
Previous 1 2 3

Matching documents

- ☐ 85% ENGINEERING CHANGE PROPOSAL Approved With Changes/Rocketdyne concour applied Sheet ENGINEERING CHANGE PROPOSAL Approved With Changes/Rocketdyne concour applied Sheet 1 of 789 1; Contractor: CAGE 02602 2; Contract: 3; PCIN: 4; ECP No: 1 5; Rev: Pratt & Whitney Rocketdyne, Inc. NAS8-01140 170254 [Source: CategoryTraining] [Size: 4236 KB] \psdkm\CategoryTraining\ECP_PDFs\111ecp1386r2.pdf [Similar documents]
- ☐ 84% ENGINEERING CHANGE PROPOSAL Sheet 1 of 466 1 Pages Affected Remarks NASA Disposition/ Authorization Basic This ECP is to update the SSME Hazard reports references to the new integrated hazard reports. [Source: CategoryTraining] [Size: 3580 KB] \psdkm\CategoryTraining\ECP_PDFs\111ecp1505.pdf [Similar documents]
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Done My Computer

Single Sign-On Access





MSFC PSD KM PROJECT

User Interface Navigation Flow

FA Process Viewer - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

Address http://localhost/portal/site/psdkm/menuitem.d5a640187469fbc5d06a5ad20f8f7818/# Go Links

NASA National Aeronautics and Space Administration NASA - PSDKM Site Home | Site Colors | Administration

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FA Process Viewer

Process Model

- Impound Hardware and Records
 - F1 - Impound Hardware and Records
 - F2 - Request Formation of Investigative Team
 - F3 - Engage Existing Contingency Team(s)
 - F4 - Determine Investigative Team/Board
 - F5 - Approve Investigative Team/Board
 - F6 - Announce Team/Board Formation
 - F7 - Convene Team/Board (to Begin Investigation)
 - F8 - Early Investigation Analysis
 - F9 - Refine Investigative Plan and Action Items
 - F10 - Travel to Event Site
 - F11 - Perform On-Site Analysis
 - F12 - Perform Full Analysis of Event
 - F12A - Research System / Component Data
 - F12B - Update/Maintain "Event" Timelines
 - F12C - Update & Maintain "Failure Scenarios"
 - F12D - Finalize Fault Tree Analysis / Failure Path Diagram
 - F12E - Develop / Update Fault Tree Matrix / Pro Con Chart
 - F12F - Conduct Testing / Analysis (as Required)
 - F12G - Determine Reasonable Event Causes
 - F13 - Develop Documented Findings
 - F14 - Determine / Recommend Design/Program
 - F15 - Approval / Redirection of Findings and Recommendations
 - F16 - Publish Findings & Recommendations
 - F17 - Document/Submit Lessons Learned & Recommendations
 - F18 - Implement Design / Process / Program
 - F19 - Prepare Final Close-Out Package / Briefing
 - F20 - Release Final Close-Out Package / Briefing
 - F21 - Approve Program Resumption
 - F22 - Archive Documentation

Full Analysis

Parent

AND

Research System / Component Data (F12A)

Update/Maintain "Event" Timelines (F12B)

AND

Update & Maintain "Failure Scenarios" (F12C)

Finalize Fault Tree Analysis / Failure Path Diagram (F12D)

Develop / Update Fault Tree Matrix / Pro Con Chart (F12E)

Conduct Testing / Analysis (as Required) (F12F)

Determine Reasonable Event Causes (F12G)

Overview Map 110%

F12E

Process Step Name: Develop / Update Fault Tree Matrix / Pro Con Chart

Process Description: The Fault Tree Matrix supports the Fault Tree Analysis Diagram by providing a worksheet of failure causes, fault tree cross references, pros (evidence supporting contribution to the observed condition), cons (evidence exonerating the cause as a contributor to the observed conditions) and status. This will be a working document and will be updated until the investigation is complete, and all credible causes dispositioned.

Policies / Procedures: Mishap & Anomaly Procedure, NPR-8621.1 (NASA Procedural

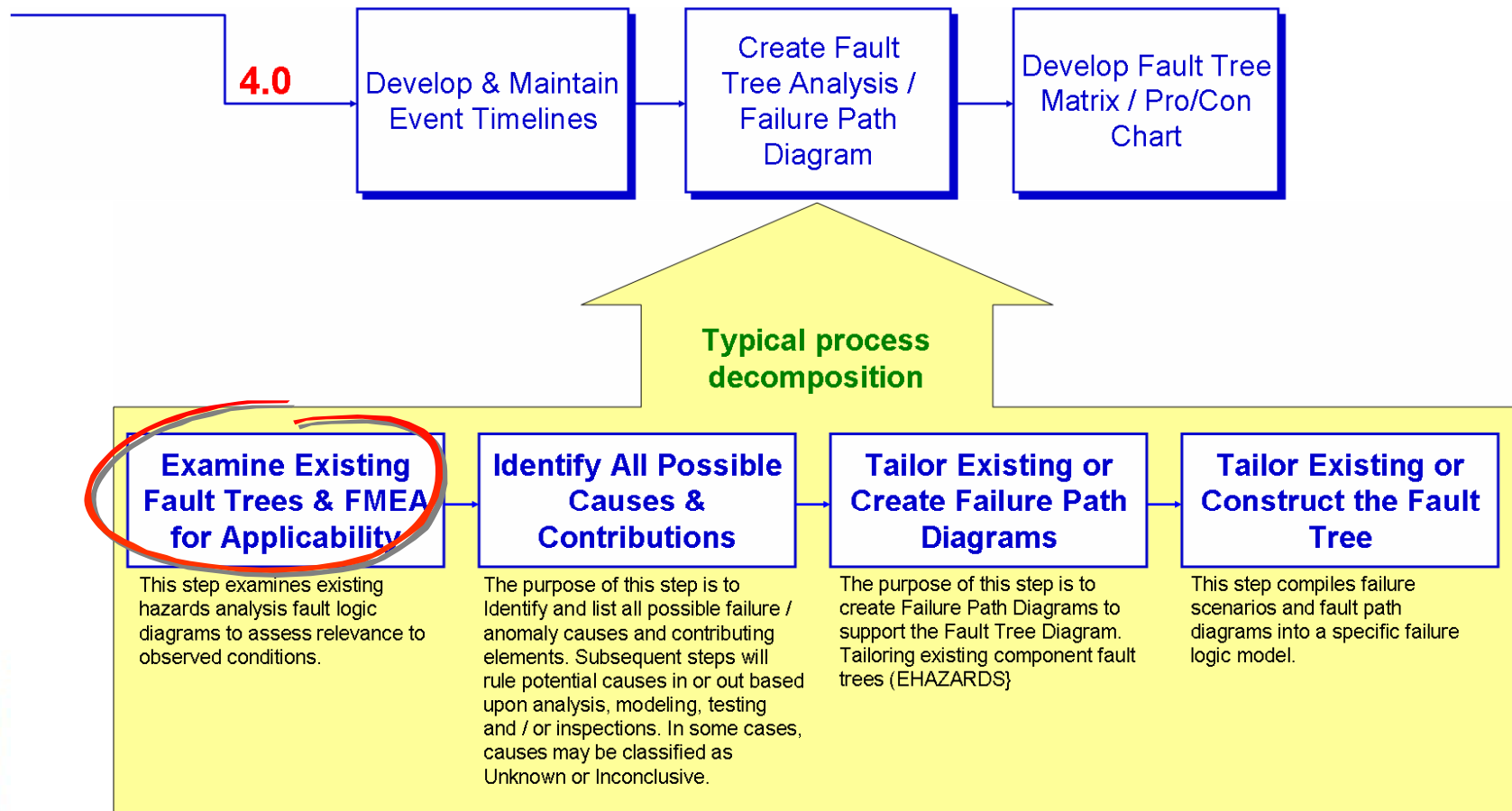
Local intranet



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User Interface Navigation Flow

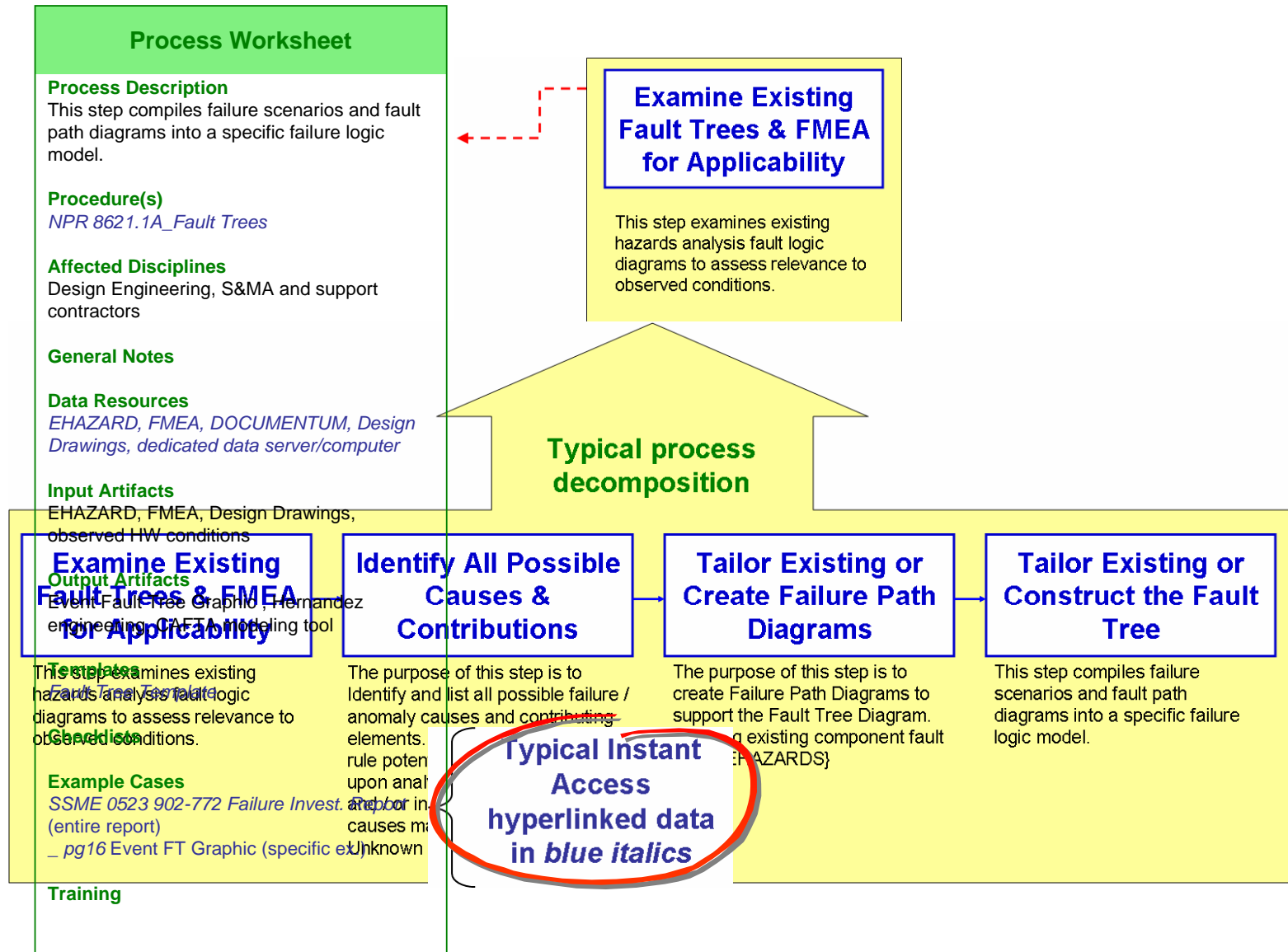
Community of Practice Process Workflow Navigation





MSFC PSD KM PROJECT

User Interface Navigation Flow





MSFC PSD KM PROJECT

User Interface Navigation Flow

Process Worksheet

Process Description

This step compiles failure scenarios and fault path diagrams into a specific failure logic model.

Procedure(s)

NPR 8621.1A_Fault Trees

Affected Disciplines

Design Engineering, S&MA and support contractors

General Notes

Data Resources

EHAZARD, FMEA, DOCUMENTUM, Design Drawings, dedicated data server/computer

Input Artifacts

EHAZARD, FMEA, Design Drawings, observed HW conditions

Output Artifacts

Event Fault Tree Graphic , Hernandez engineering, CAFTA modeling tool

Templates

Fault Tree Template

Checklists

Example Cases

*SSME 0523 902-772 Failure Invest. Report (entire report)
_pg16 Event FT Graphic (specific ex.)*

Training

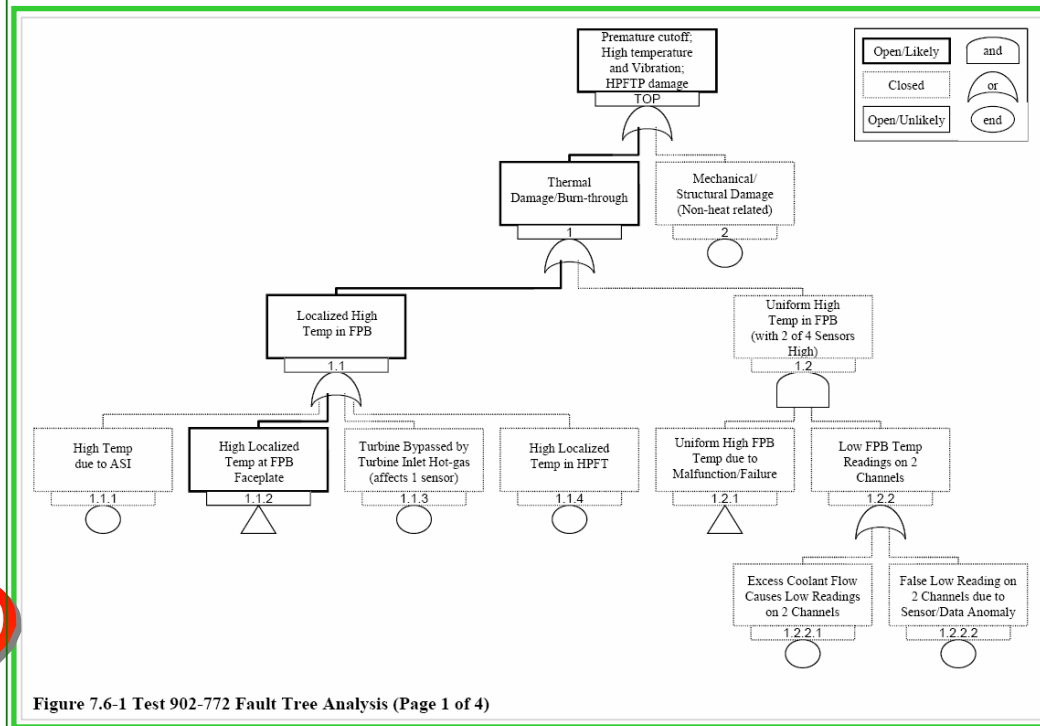


Figure 7.6-1 Test 902-772 Fault Tree Analysis (Page 1 of 4)



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User Interface Navigation Flow

Category Search - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites RSS Check AutoLink AutoFill Send to nasa msfc Settings

Address C:\PSD KM\Sample UI\Category Search.htm

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Marshall Space Flight Center

Propulsion Systems Department Knowledge Management System

Basic Advanced Boolean Parametric + GO

Turbine blade ECP

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+ COMMUNITIES + PROCESS + CAD VIEWER + MY PAGE - SEARCH

- RETRIEVAL + COMMUNITY + CATEGORIES + CLUSTERING + SAVE

Retrieval Results Suggested Categories Suggested Clusters

1 - 6 of 501 results
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User Interface Navigation Flow

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Back Forward Stop Home Search Favorites

Address http://localhost/portal/site/psdkm/menuitem.ca43c8ab62632cc5d06a5ad20f8f7818/ Go Links

NASA National Aeronautics and Space Administration

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CAD Viewer

2D CAD Drilldown Portlet

P-BLADE-MAIN OXZ PUMP TURBINE, 2STA (view) x 54
T-BLADE-MAIN OXZ PUMP TB, 2STAGE, CS x 1
S-BLADE-MAIN OXZ PUMP TURBINE, 2STA (view) x 53
T-CONVERTER-INTERPROPELLANT CONVERTER (view) x 1
T-INVERTED NUT-SPNR, 5.125-12X.575 (view) x 1
L-WASHER-SPGT 2.8730X3.395X.300 (view) x 1
F-INVERTED NUT-SPANNER, 5.500-12X.3 x 1
P-SPACER-INTERPROPELLANT CONVERTER (view) x 1
F-WASHER-SPGT, 3.300X3.575X.012 x 1
F-DAMPER-MAIN OXIDIZER PUMP TURBIN x 54
F-DAMPER-MAIN OXIDIZER PUMP TURBIN x 54
F-DAMPER-MAIN OXIDIZER PUMP TURBIN x 54
G-RING-RTG, 7.894 HSG D X.140X.100S (view) x 1
G-RING-RTG, 7.894 HSG D X.140X.100S (view) x 1
H-SEAL-PLAIN, .794X.110X.107 x 10
H-RING-ANTI-ROTATION, TURBINE STATO x 1
S-BLADE-MAIN OXZ PUMP TURBINE, 1STA (view) x 1
T-BLADE-MAIN OXZ PUMP TURBINE, 2STA (view) x 1
J-GASKET-.705 OOK.127, SPRING x 1
H-GASKET-.885 OOK.127, SPRING x 1
G-BOLT-MACHINE, .190-32X.625, DH x 22
G-BOLT-MACHINE, .190-32X.688, DH x 8
G-BOLT-MACHINE, .190-32, .875, DH x 24
G-BOLT-MACHINE, .190-32.1.000, DH x 41
F-BOLT-MA, .3125-24X.500, DRILLED DH x 20
J-BOLT-MACHINE, .190-32X.625, DH x 2
F-RETAINER-SEAL x 1
F-SCREW-MACHINE, .164-36X.562, DH x 4
H-BOLT-MACHINE, .190-32X.500, DH x 1
H-BOLT-MACHINE, .190-32X.875, DH x 4
E-WASHER-KEY, .2335IDX.377DIA, 022 x 2
K-GASKET-6.2365 OOK.190, SPRING x 1
K-HOUSING-PREB OXIDIZER PUMP BEAR (view) x 1
C-PIN-SHLDR, HDLS, .1875X.375X.9225 x 3
H-BOLT-INSTRUMENTATION ADAPTER, 1.4 x 26
G-BOLT-INSTRUMENTATION ADAPTER, 3.3 x 1
J-SEAL-PLAIN, .172X.070X.100, FLANGE x 1
B-WASHER-KEY, 5.030X5.305X.031 x 1
P-CONNECTOR-ASYO-TUBE, PURGE SUPPLY (view) x 1
J-PLUG-INSTRUMENTATION BOSS x 1
D-BOLT-MACHINE, .190-32X.680, DH x 11
C-SHIELD-HEAT, OXIDIZER TROP DUCT x 4
C-BOLT-MA, .190-32X1.340, DOUBLE HEX x 11
D-SLEEVE-OXIDIZER TURBOPUMP SHAFT (view) x 1
D-TIE ROD-.5625-18X2.640, SOCKET x 1
F-RING-DOGC OXZ PUMP TURBINE RPHO x 1

Disc Coolant Tubes (0.250") 4 places, 347 SS

Turbine Inlet 3 Tooth Knife Edge

Coolant Manifold

Retaining Plate

Deflector & Flow Guide INCO 909

CAVAL Disk and Shaft PWA 1074, IN100, R

Deep Drill by Dearborn, Mich.

Torsion Spring IN100

Pre-load Spring

440C Races

IPS Sleeve 718, NR

Primary H2 Drain

O.D. Load ring, IN100

Retaining Ring, IN100

J-Seal (1st Turbine Vane), Waspaloy Gold Plated

Turbine Blade - Cast Single Crystal - Hovmet Aerospace Tech. Machines PWA 1493

54 Blade Retainers, IN100

2nd Stage Spacer, IN100 - Superior Shot Peen Fir-Trees, 54 Total

R.B. Knife Seal

3rd Stage Spacer, IN100 - 54 Total

Blade Damper, IN100

C - seal

Armalon Cage

Turbine Outlet Duct, 4 K.E., PWA 1143

Roller Bearing, 440C, 14 Rollers

Main Exit Seal, NR, 2 Tooth, INCO 909

TEBB, 440C, 16 Balls

Bearing Sleeve 718

Waspaloy "E" Seal

Overview Map

4:1

Keyword Search

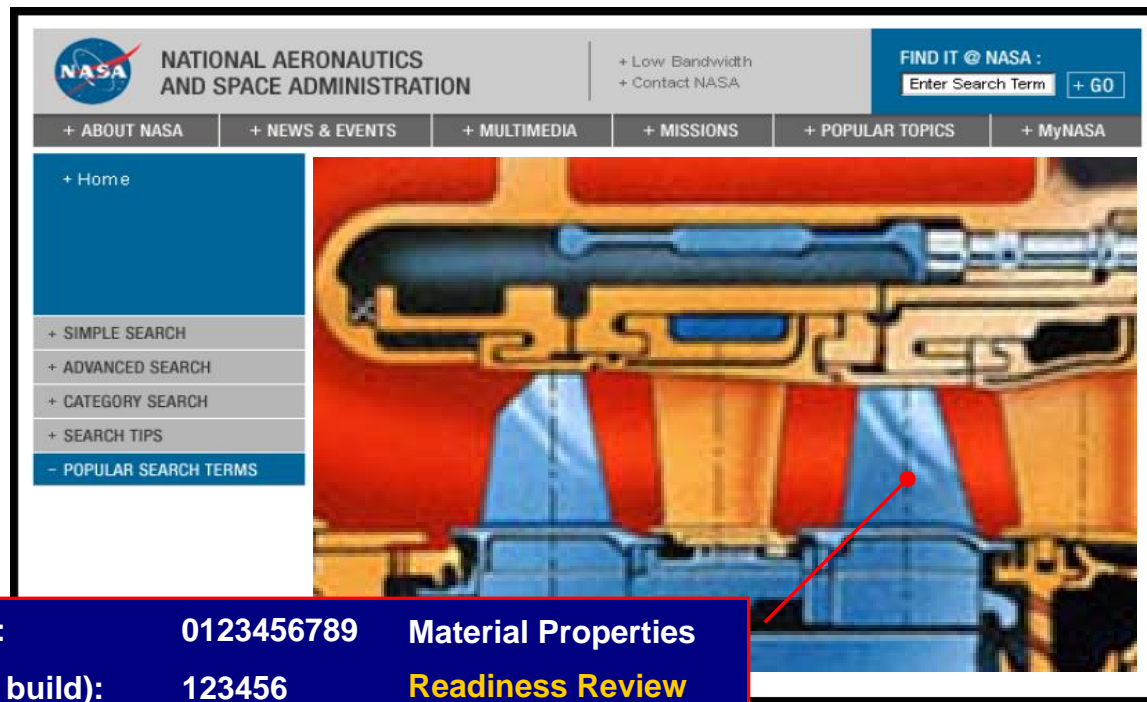
Drawing Number:	4750102
Description:	P-BLADE-MAIN OXZ PUMP TURBINE, 2STA (view) x 54
Drawings:	4750102[1].001-P.tif
Qty:	54
Formatted CSN / Find Number:	033-0000
Keywords:	4750102, "turbine blade"
Design Environment:	file:///Z:/SSME-Technical/SSME/Design-Certification Reviews/Turbomachinery/HPOTP
Materials:	Current information provided is not current. The User must correct the data for Block II
Build/Assembly Procedure:	Assembly Drawing
	Future implementation

p9a Local intranet



MSFC PSD KM PROJECT

User Interface Navigation Flow



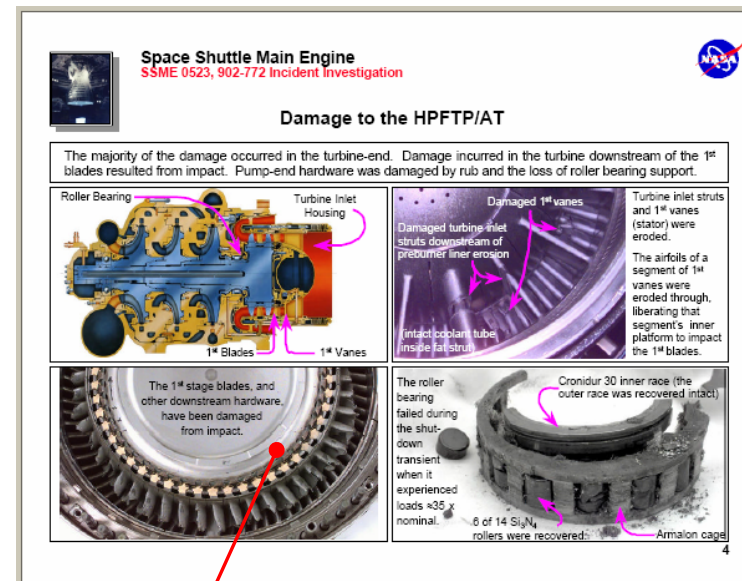
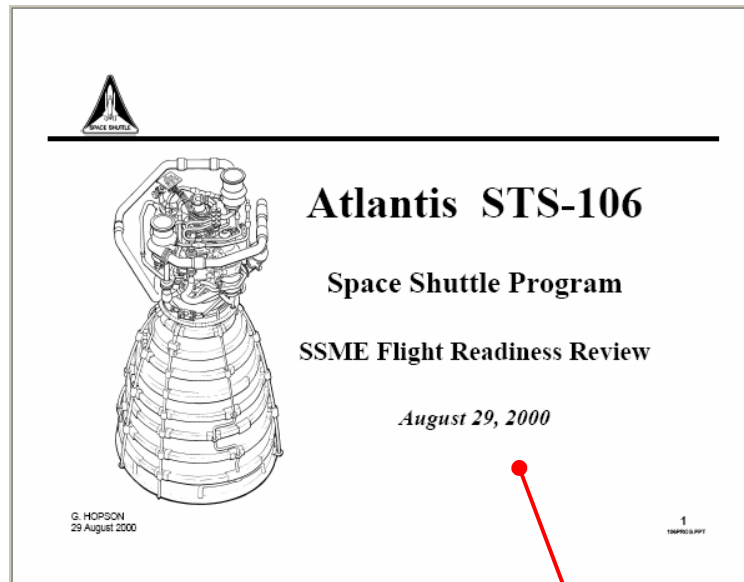
Find Number:	0123456789	Material Properties
Quantity (per build):	123456	Readiness Review
Drawing Number:	7890-1234	902-772 Incident
Material:	Super Alloy	Hydrogen Flow

Graphic “Drill - Down” Capability
Component Details View

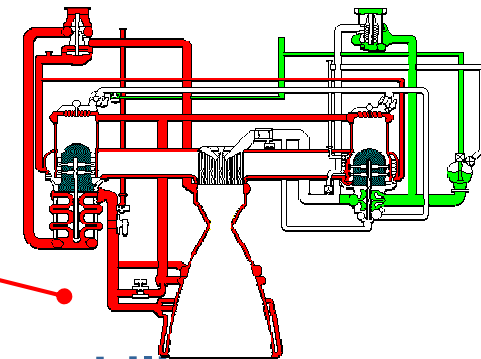


MSFC PSD KM PROJECT

User Interface Navigation Flow

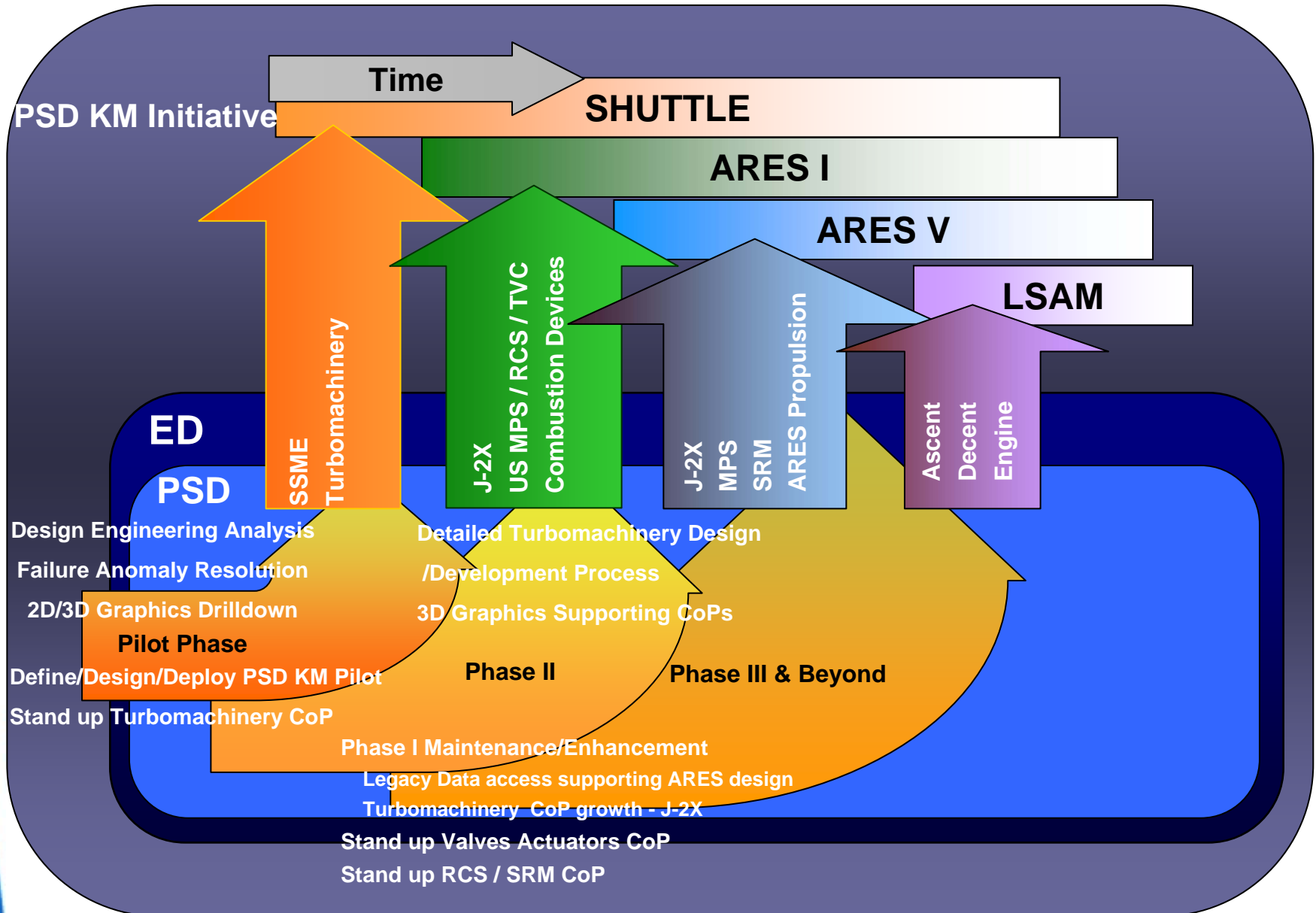


Find Number:	0123456789	Material Properties
Quantity (per build):	123456	Readiness Review
Drawing Number:	7890-1234	902-772 Incident
Material:	Super Alloy	Hydrogen Flow





PSD KM PROJECT FUTURE PLANNING





MSFC PSD KM PROJECT

Communications & Roll-Out

- **PSD KM System Briefings:**
 - JSC Knowledge Management Conference 02 March 06
 - ER Dept. Managers Brief 06 April 06
 - MSFC Technology Council 11 April 06
 - ED Management Brief 02 May 06
 - SSME Project Management Brief 09 May 06
 - SRS Review (Stakeholders) 31 May 06
 - Conceptual Design Review (Stakeholders) 29 June 06
 - PWR Meetings, Canoga Park 11 July 06
 - HQ Meetings, CIO, InsideNASA/NEN/ ESMD 13 July 06
 - NACB-ISCB Brief 23 August 06
 - Preliminary Design / UI Review (Stakeholders) 29 August 06
 - Critical Design Review (Stakeholders) 03 October 06
 - WEB PCASS 07 February 07
 - Enterprise Architecture Advisory Committee 17 February 07
 - Engineering Management Council 20 February 07
 - RSIC 23 February 07
 - IEC/DDMS 27 February 07
 - Exploration Launch Office Brief 05 March 07
 - IHS/NASA Tech Standards 22 March 07
 - CIO/ED/CLV Data Architecture 26 March 07
 - Cx Data Architecture Working Group 23 April 07
 - ARES Chief Engineers Brief 20 April 07
 - NASA HQ IDM Workshop 24 – 26 April 07
 - ARES Element Managers 08 May 07
 - Directives Access CIO 17 May 07
 - Cx ARC Architecture Team 22 May 07
 - PWR KM Program Manager Review 24 May 07
 - Engineering Directorate Review 13 June 07
 - Propulsion Department Review 14 June 07
 - Space Shuttle Transition Working Group 09 July 07
 - NASA KM International Conference 17 – 19 July 07



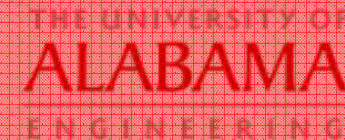
MSFC PSD KM Initiative

MSFC PSD KM Information -

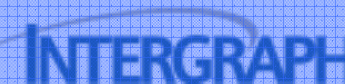
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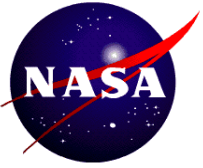


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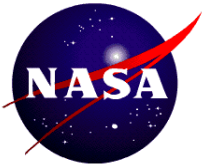
Joel Anderson
Intergraph Corporation
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Support





DATA Resource Connection

Data Source		Content	
SSME Technical		CM Documents, Nonconformance data, Engine Reviews, HRR, CE Telecons, CDR, DCR, Program reviews, Major Incident reports, IFA's, FMEA, Orientation Training, PWR Drawings, Specifications, Photos, Flight Ops handbook...	
MSFC Repository		Adv Lunar systems, Mars exploration, NGLT, IPD, Nuclear Propulsion, Shuttle Projects	
LASSE		Apollo, Saturn, ALS, Aerodynamics, Propulsion, Cryogenics, Centar, X-vehicle	
MSFC Multi-Program/Proj Docs		MSFC Specifications, Standards, Requirements, Handbooks, Plans, Processes	
MSFC Directives Master List		MSFC Policy Directives, Procedural requirements, Work instructions, Guidance Manual	
PRACA (MSFC)		All Shuttle Problem Reports and Corrective Action	
Shuttle Online		Flight Readiness Reviews, PSE&I, CERB, PRB docs, Intg Weekly Reports, Shuttle Contingency plan, Shuttle CM Plan	
Jetson		SSME Data Review Packages (Test & Flight)	
STI Database (Scientific & Technical Information)		Aeronautics/Astronautics, Chemistry, Physics, Mathematics, Computer Science, Engineering, Space Science, Geo Science	
NASA Technical Standards		AIAA, AMS, ASTM Material Specifications, ANSI/ABMA/NAS Aerospace Standards, Mil Stds Industry Stds	
WebPCASS		All PRACAs (KSC PRs, IPR, DRs, GFE, MSFC UCRs, IFAs) Shuttle CIL / HA, OMRSD, LCC, Waivers	
SSPWEB		NSTS 7700 volumes	
Shuttle Portal		Shuttle Project collaboration, Project data	
NEN		Inside NASA, LLIS, Online directives, NASA Image exchange, Electronic parts and Packaging	
RISC		Technical and Scientific reference books, manuals Journals.	
ICE Windchill		Structured Data Management system, All ESMD program data, Schedules, EVM, Risk Management	
IEC/ DDMS		Integrated design environment, Configuration Management system.	
Maptis		Materials specifications and properties testing	
CASI		Technical, Scientific reports, Journals, Articles, Papers	
Contractor Data systems		Metaphase, Nexprize, ACTs, ADM, Prams, Rams,	
Pilot Indexed		Phase II	
MOU Negotiation Underway		Long range	



MSFC PSD KM PROJECT

Unique Functionality

- **Community of Practice** – Provides a forum for individuals with shared interest or expertise to exchange ideas and experiential knowledge
 - Collaboration / Sharing, Knowledge Capture, Expertise Locator, Training
- **Single Sign On** – MSFC domain log in provides authenticated user access to PSD KM and all authorized accounts
- **Automatic Profiling** – Monitors user data interaction preferences and automatically forms profiles of their interest and expertise
- **Categorization** – Automatically categorizes data without the need for manual intervention
- **Disparate Repository / Unstructured Data Interface** – Access data where it resides within or outside of product structure / data management system environment
- **Conceptual Retrieval** – Extracts meaning from key words and complex terminology embedded in query information; Returns search results based on concept matching



MSFC PSD KM PROJECT

Unique Functionality (Cont'd)

- **Hardware Graphics Viewer** – Point and click access from graphic image to broad range of related design information, subject matter expertise, lessons learned and training
- **Process Workflow Viewer** – Enables the user to locate relevant information within the context of a process step
 - Search and retrieval functionality from Failure/Anomaly and Design Engineering Analysis workflow navigation, "process-based" data associations
- **Expertise Locator** – Automatically identifies individuals with expertise in organizations and identifies subject matter knowledge in any required field
- **KM awareness, cultural change/motivational training** - Integral to CoP roll out



PSD KM / PDMS Design Characteristics

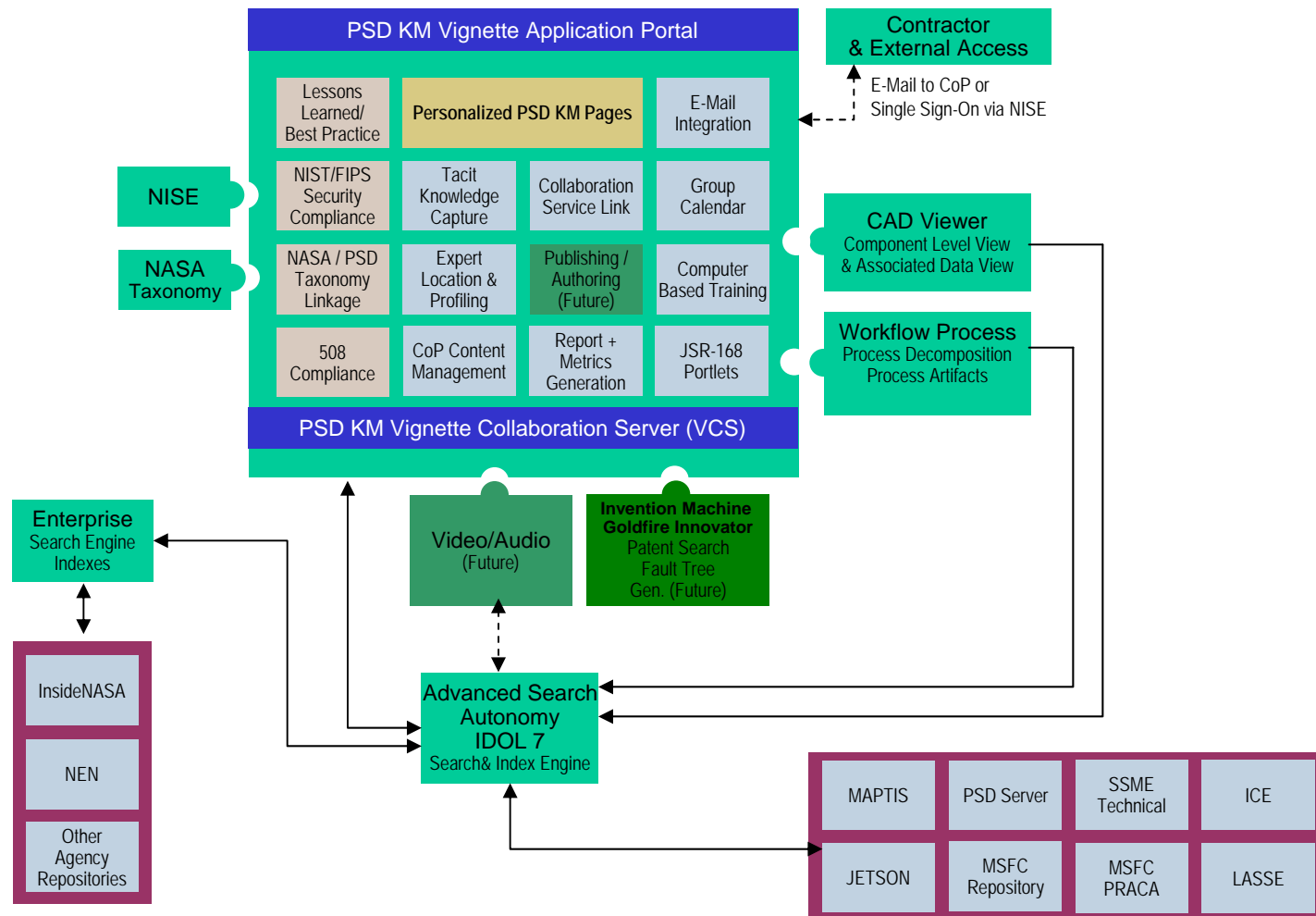
	PSD Knowledge Management	Product Data Management
Focus Area	Individual & Collective Knowledge	Managing Product/Project Data
Information Management	Unstructured information Contextual search outside of PDMS	Structured Information Search limited to PDMS data structure
Timeframe	Ongoing. Doesn't stop as long as the body of knowledge is relevant.	Project Life cycle. Has a finite start and end date.
Scope	Any repository or information source that contains useful knowledge	Only information contained in its internal repository.



MSFC PSD KM PILOT PROJECT

Design / Architecture (Pilot)

Componentized Resources System View



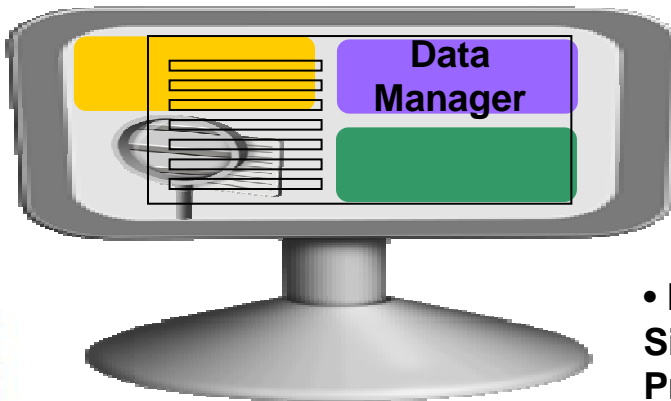


CoP Process Creation / Maintenance



CoP User Inputs Process / Change

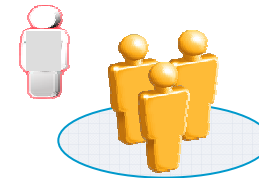
- Use CoP Input Template and MS Office Suite to Propose Process Workflows
- Submit Using CoP Suggestion Box
- Post to Community Forum



- Data Manager to Allow Simple Maintenance of Process Data & Links

CoP Moderator Leads Review

- Recommended as Best Practice
- Review w / Initiator
- Collaborate w/ SMEs
- Approve / Reject



Enter & Validate Process / Data

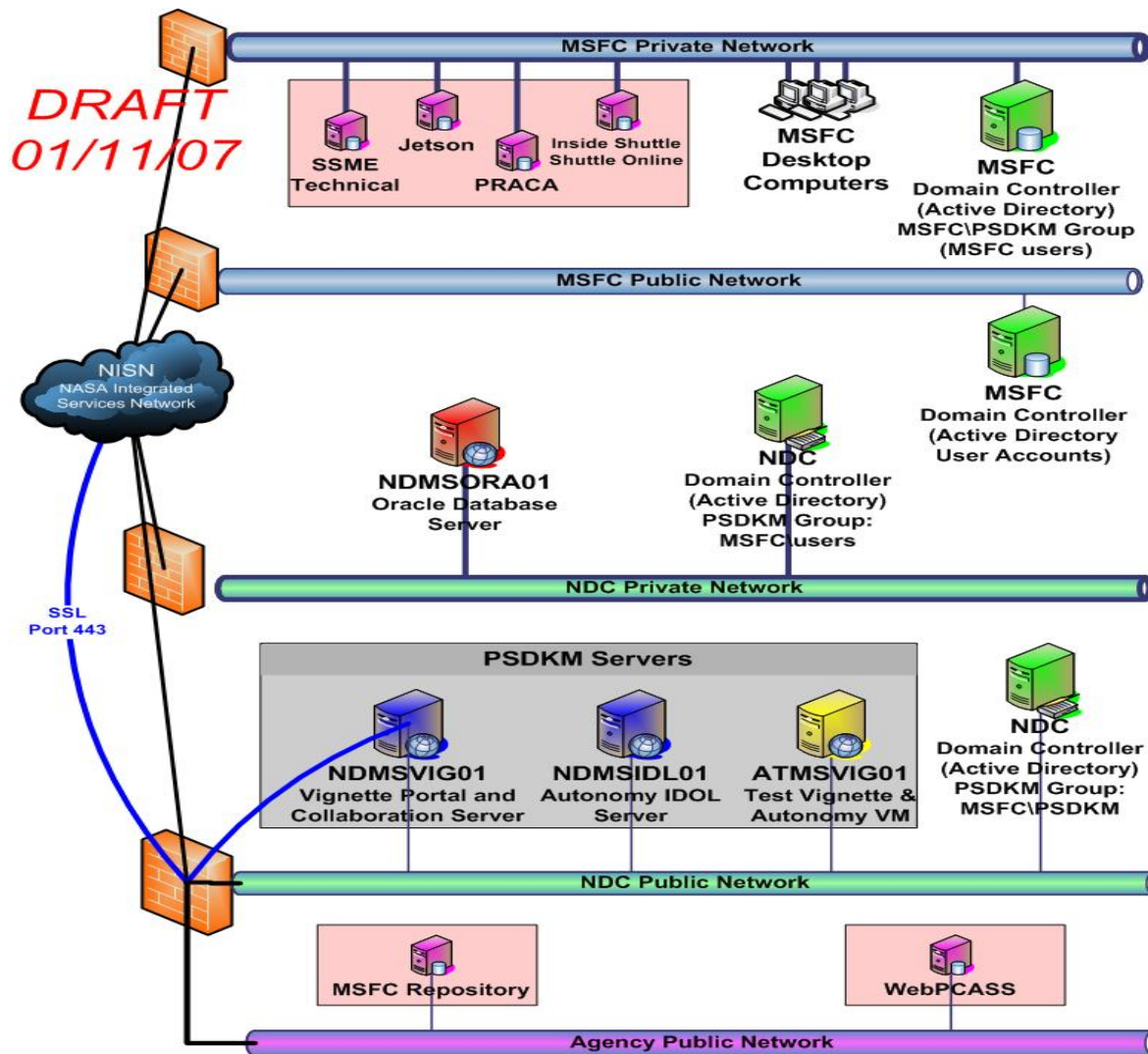
- Load Process Model / Data
- Validate in Process Viewer
- Publish in Community Knowledge Storehouse

Community Can Create New, Change Existing and Maintain Processes



MSFC PSD KM System

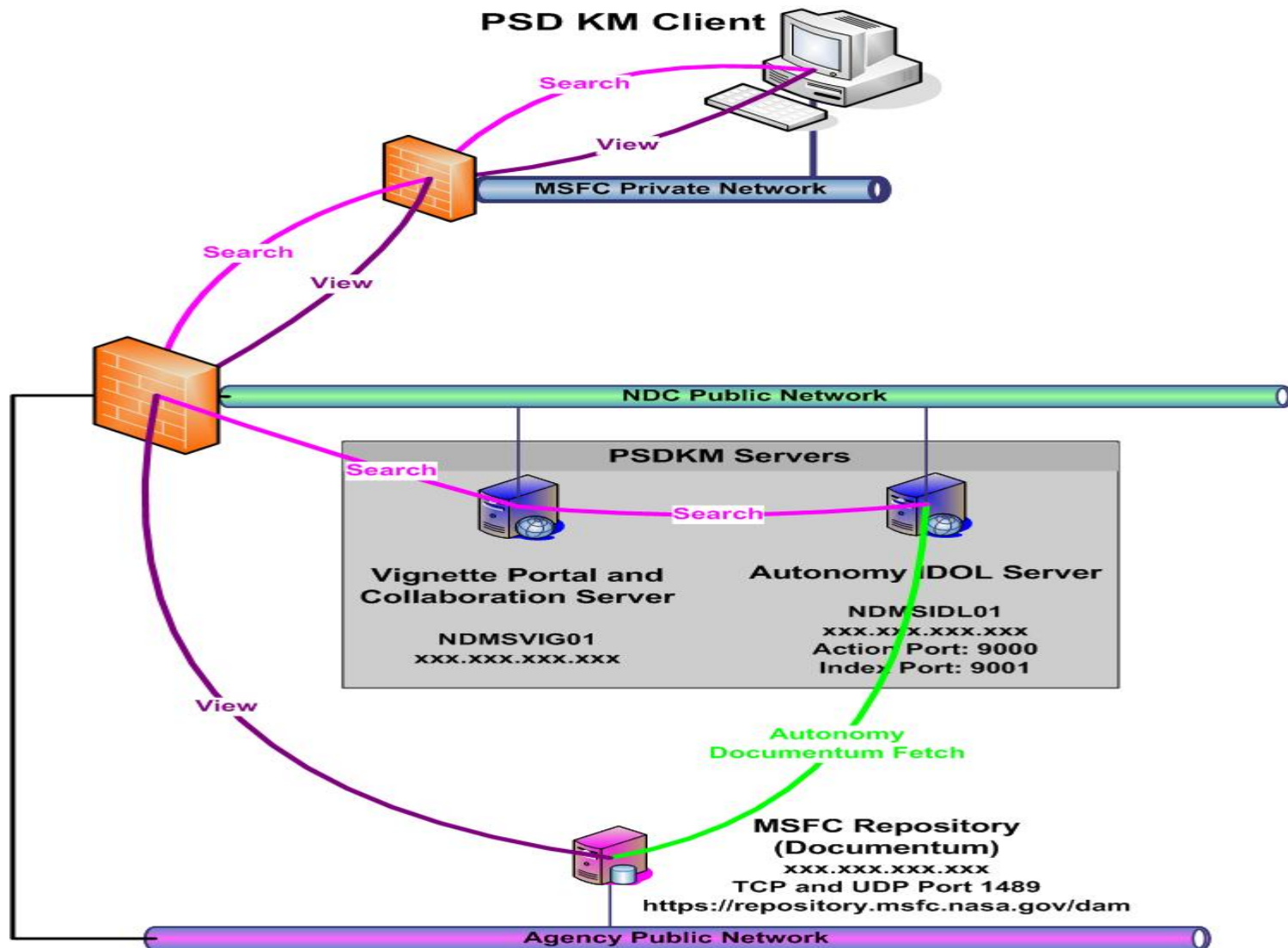
Pilot Portal Schematic





MSFC PSD KM System

Pilot Portal Schematic, Documentum Query/Fetch





MSFC PSD KM PROJECT

KM Pilot System Data Security

Security Policy

- **Designed for Compliance with Enterprise Architecture**
- **Enforcement of internal authentication models for repositories, proprietary applications, and software.**
- **Portal LDAP ensures automatic verification against user, group and role level entitlement**
 - **Will align with the NDC active directory, migrating to NISE**
- **KM Program will comply with NPR 2810.1, NIST 800-53**
 - **Moderate security classification based on FIPS 199, NIST 800-60**
- **Application Security Plan is in Work**